IN THE CLAIMS:

Please note that all claims currently pending and under consideration in the referenced application are shown below, in clean form, for clarity.

Please amend the claims as follows:

1. (Amended five times) A sample separation apparatus, comprising:

a substrate comprising at least one of silicon, gallium arsenide, and indium phosphide;

matrices formed in said substrate, said matrices comprising at least two distinct, unconnected porous regions, each of said at least two porous regions extending at least partially across said substrate; and

at least one detector fabricated on said substrate in communication with at least one of said at least two porous regions.

3. (Previously amended twice) The sample separation apparatus of claim 1, wherein each of said at least two porous regions comprises a capillary column.

4. (Previously amended three times) The sample separation apparatus of claim 1, wherein each of said at least two porous regions linearly traverses said substrate.

5. (Previously amended three times) The sample separation apparatus of claim 1, wherein one of said at least two porous regions extends only partially across said substrate.

6. (Previously amended twice) The sample separation apparatus of claim 5, wherein one of said at least two porous regions comprises a control column.

7. (Previously amended twice) The sample separation apparatus of claim 1, further comprising a reaction region immediately situated along a length of and contiguous with at least one of said at least two porous regions.

8. The sample separation apparatus of claim 7, wherein said reactant region comprises a capture component.

9. (Previously amended twice) The sample separation apparatus of claim 7, wherein said reaction region is situated at a predetermined distance from an end of said at least one porous region.

10. (Previously amended twice) The sample separation apparatus of claim 5, further comprising reaction regions situated immediately along lengths of each of said at least two porous regions.

11. (Previously amended twice) The sample separation apparatus of claim 10, wherein a distance between a first of said reaction regions and an end of a first of said at least two porous regions is substantially the same as a distance between a second of said reaction regions and an end of a second of said at least two porous regions.

13. (Previously amended) The sample separation apparatus of claim 1, wherein said at least one detector comprises a thermal detector.

14. (Previously amended) The sample separation apparatus of claim 1, wherein said at least one detector comprises a field effect transistor.

15. (Previously amended) The sample separation apparatus of claim 1, wherein said at least one detector comprises a voltage application component and a current detection component.

16. (Previously amended twice) The sample separation apparatus of claim 1, further comprising a processor on said substrate.

17. (Previously amended twice) The sample separation apparatus of claim 1, further comprising a memory device on said substrate.

18. (Previously amended twice) The sample separation apparatus of claim 1, further comprising a migration facilitator in communication with at least one of said at least two porous regions.

19. (Previously amended twice) The sample separation apparatus of claim 18, wherein said migration facilitator comprises a pump in communication with a first end of said at least one porous region.

20. (Previously amended) The sample separation apparatus of claim 19, further comprising a control valve situated between said pump and said first end.

21. (Previously amended twice) The sample separation apparatus of claim 18, wherein said migration facilitator comprises a vacuum source operatively in communication with a second end of said at least one porous region.

22. (Previously amended twice) The sample separation apparatus of claim 18, wherein said migration facilitator comprises a first electrode adjacent said first end of said at least one porous region and a second electrode adjacent a second end of said at least one porous region.

23. The sample separation apparatus of claim 22, wherein said first electrode is a cathode.

24. The sample separation apparatus of claim 22, wherein said second electrode is an anode.

25. (Previously amended) The sample separation apparatus of claim 1, further comprising a stationary phase disposed in at least one of said matrices.

26. The sample separation apparatus of claim 25, wherein said stationary phase comprises a capture substrate.

27. The sample separation apparatus of claim 26, wherein said capture substrate comprises an antibody.

28. The sample separation apparatus of claim 26, wherein said capture substrate comprises an antigen.

29. (Previously amended twice) The sample separation apparatus of claim 1, further comprising a sealing element situated over at least a portion of at least one of said at least two porous regions.

30. (Amended four times) A separation apparatus, comprising:

a substrate;

at least two distinct, unconnected capillary columns formed in said substrate, each of said at least two capillary columns comprising a porous matrix; and

Excon 1 a detector fabricated on said substrate and situated adjacent at least one of said at least two capillary columns.

31. (Previously amended) The separation apparatus of claim 30, wherein said substrate comprises silicon, gallium arsenide, or indium phosphide.

32. (Previously amended) The separation apparatus of claim 30, wherein each said porous matrix comprises porous silicon.

33. (Previously amended) The separation apparatus of claim 30, wherein at least one said porous matrix comprises hemispherical grain silicon.

34. (Previously amended) The separation apparatus of claim 30, further comprising a solid phase disposed on said porous matrix of at least one of said at least two capillary columns.

35. The separation apparatus of claim 34, wherein said solid phase comprises a capture substrate.

36. The separation apparatus of claim 35, wherein said capture substrate comprises an antibody.

37. The separation apparatus of claim 35, wherein said capture substrate comprises an antigen.

38. The separation apparatus of claim 34, wherein said solid phase comprises silicon oxide.

39. (Previously amended twice) The separation apparatus of claim 30, further comprising a pump in communication with at least one of said at least two capillary columns.

40. (Previously amended twice) The separation apparatus of claim 30, further comprising a valve in communication with an end of at least one of said at least two capillary columns.

41. (Previously amended twice) The separation apparatus of claim 30, including a vacuum source in communication with at least one of said at least two capillary columns.

42. (Previously amended twice) The separation apparatus of claim 30, including a first electrode in communication with a first end of a first capillary column of said at least two capillary columns and a second electrode in communication with a second end of said first capillary column.

43. (Previously amended) The separation apparatus of claim 30, further comprising a processor in communication with said detector.

44. The separation apparatus of claim 30, further comprising a memory device on said substrate.

46. (Previously amended twice) The separation apparatus of claim 30, wherein said at least two capillary columns have substantially equal lengths.

48. (Previously amended) The separation apparatus of claim 30, wherein said porous matrices each comprise substantially equal surface areas.

49. (Previously amended) The separation apparatus of claim 48, wherein said at least two capillary columns each comprise substantially equal volumes.

50. (Previously amended twice) The separation apparatus of claim 30, further comprising a sealing element situated over at least a portion of at least one of said at least two capillary columns.

51. (Amended four times) A miniature chromatograph, comprising:

a substrate;

porous matrices formed in said substrate and comprising at least two distinct, unconnected capillary columns, said porous matrices each comprising a plurality of pores.

52. (Previously amended twice) The miniature chromatograph of claim 51, further comprising at least one detector situated adjacent at least one of said at least two capillary columns.

53. The miniature chromatograph of claim 52, wherein said at least one detector comprises a thermal detector.

54. The miniature chromatograph of claim 52, wherein said at least one detector comprises a field effect transistor.

55. The miniature chromatograph of claim 52, wherein said at least one detector comprises a voltage application component and a current detection component.

56. (Previously amended twice) The miniature chromatograph of claim 51, further comprising a sealing element situated over at least a portion of at least one of said at least two capillary columns.

57. (Previously amended three times) An electrophoretic apparatus, comprising:
a substrate comprising at least one of silicon, gallium arsenide, and indium phosphide;
at least one sample column formed in said substrate and comprising a first end, a second end, and a first porous matrix which comprises a first plurality of pores; and
a control column comprising a second porous silicon matrix comprising a second plurality of pores formed in said substrate.

58. (Previously amended) The electrophoretic apparatus of claim 57, further comprising:
a first electrode situated proximate said first end; and
a second electrode situated proximate said second end.

59. The electrophoretic apparatus of claim 58, wherein said first electrode is a positive electrode.

60. The electrophoretic apparatus of claim 58, wherein said second electrode is a negative electrode.

61. (Previously amended) The electrophoretic apparatus of claim 58, wherein said first electrode and said second electrode, when operably connected to a power source, are capable of generating a current along a distance of at least one of said at least one sample column and said control column.

62. The electrophoretic apparatus of claim 57, wherein said first porous matrix comprises porous silicon.

63. The electrophoretic apparatus of claim 57, wherein said first porous matrix comprises hemispherical grain silicon.

64. (Amended four times) An analyte detection apparatus, comprising:

a substrate comprising silicon; and

matrices formed in said substrate, said matrices comprising at least two distinct, unconnected porous columns continuous with a surface of said substrate.

66. (Previously amended twice) The analyte detection apparatus of claim 64, further comprising a capture substrate disposed on at least one of said matrices.

67. The analyte detection apparatus of claim 66, wherein said capture substrate comprises an antibody.

68. The analyte detection apparatus of claim 66, wherein said capture substrate comprises an antigen.

69. The analyte detection apparatus of claim 66, further comprising at least one detector proximate said capture substrate.

70. The analyte detection apparatus of claim 69, wherein said at least one detector is a thermal detector, a field effect transistor, or current detector.

71. (Previously amended) The analyte detection apparatus of claim 64, further comprising a reaction region along the length of at least one of said at least two porous columns.

72. (Previously amended three times) The analyte detection apparatus of claim 64, wherein at least one of said at least two porous columns comprises a control column.

73. The analyte detection apparatus of claim 64, wherein said porous column comprises a matrix of porous silicon.

74. The analyte detection apparatus of claim 64, wherein said porous column comprises a matrix of hemispherical grain silicon.

105. (Previously amended) An ultrasmall flow channel device, comprising:
a flow inlet; and
a flow channel connected to said inlet, said flow channel comprising a matrix formed of hemispherical grained silicon.

106. The ultrasmall flow channel device of claim 105, wherein said flow channel further comprises a stationary phase disposed on said hemispherical grained silicon.

107. The ultrasmall flow channel of claim 106, wherein said stationary phase comprises silicon oxide.